

CLAIMS

What is claimed is:

1. A method for improving the bond strength between at least two heat deformed thermoplastic sheets forming a unitary structure, the method comprising:

extruding a continuous web of thermoplastic having a top surface and a bottom surface;

conveying the continuous web of thermoplastic through a down-stream work station scuffing the top surface, wherein the top surface is characterized having increased surface area relative the bottom surface;

shearing the continuous web of thermoplastic providing a plurality of sheets having scuffed top surfaces;

thermoforming simultaneously at least a first sheet over a first mold and a second sheet over a second mold upon a machine frame; and

compressing a heated first sheet against a heated second sheet between the first mold and the second mold upon the machine frame to bond the scuffed top surface of the first sheet to the smooth surface of the second sheet.

2. The method of claim 1 wherein three scuffed sheets are thermoformed simultaneously and compressed sequentially upon a machine frame to provide a unitary triple sheet structure.

3. The method of claim 1 wherein the continuous web of thermoplastic is conveyed through at least one down-stream workstation whereby the top and bottom smooth surfaces of said continuous web are scuffed increasing the surface areas thereof.

4. An article of the method of claim 3 characterized in that the article is a thermoformed plastic pallet.

5. An article made in accordance with the procedure comprising:

(a) extruding a continuous web of thermoplastic having a top surface and a bottom surface;

(b) conveying the continuous web of thermoplastic through a scuffing work station where after the top surface is characterized having increased surface area relative the bottom surface;

(c) shearing the continuous web of thermoplastic providing a plurality of sheets having scuffed top surfaces;

(d) heating a first sheet;

(e) forming the first sheet with a first mold;

(f) heating a second sheet;

(g) forming the second sheet with a second mold;

(h) aligning the first mold with the second mold so a scuffed top surface of the first sheet faces a bottom surface of the second sheet;

(i) moving the first mold toward the second mold;

(j) joining together sections of the scuffed top surface of the first sheet with sections of the bottom surface of the second sheet to form a twin sheet subassembly;

(k) heating a third sheet;

(l) forming the third sheet with a third mold;

(m) aligning the third mold with the twin sheet subassembly;

(n) moving the twin sheet subassembly toward the third mold; and,

(o) joining together sections of a scuffed top surface of the twin sheet subassembly with sections of the bottom surface of the third sheet to form a triple sheet article.

6. An article made in accordance with claim 5 wherein the thermoplastic is composed of a polyolefin resin.

7. A pallet made in accordance with the method comprising:

(a) extruding a continuous web of thermoplastic having a top surface and a bottom surface;

(b) conveying the continuous web of thermoplastic through a scuffing work station where after the top surface is characterized having increased surface area relative the bottom surface;

(c) shearing the continuous web of thermoplastic providing a plurality of sheets having scuffed top surfaces;

(d) heating a first sheet;

- (e) forming the first sheet with a first mold;
- (f) heating a second sheet;
- (g) forming the second sheet with a second mold;
- (h) aligning the first mold with the second mold so a scuffed top surface of the first sheet faces a bottom surface of the second sheet:
 - (i) moving the first mold toward the second mold;
 - (j) joining together sections of the scuffed top surface of the first sheet with sections of the bottom surface of the second sheet to form a twin sheet subassembly;
- (k) heating a third sheet;
- (l) forming the third sheet with a third mold;
- (m) aligning the third mold with the twin sheet subassembly;
- (n) moving the twin sheet subassembly toward the third mold; and,
- (o) joining together sections of a scuffed top surface of the twin sheet subassembly with sections of the bottom surface of the third sheet to form a triple sheet pallet.

8. A pallet made in accordance with claim 7 wherein at least one exposed surface of the pallet is scuffed providing a high coefficient of friction for a skid resistant surface.

9. A pallet made in accordance with claim 7 wherein after the step (e) a rigid member is inserted into the machine frame from an external adjacent location for placement upon the first sheet prior to the step (j) to form a rigidified twin sheet subassembly.

10. A pallet made in accordance with claim 7 wherein after the step (j) a rigid member is inserted into the machine frame from an external adjacent location for placement upon the twin sheet subassembly prior to the step (o) to form a rigidified triple sheet pallet.

11. An article resistant to fire and the heat of fire, the article comprising:
a first sheet of thermoformable plastic, comprising a surface layer of an intumescent polyolefin composition resistant to fire and an interior substrate layer of a polyolefin resin, provided in a co-extrusion construction molded over a first mold to provide a first surface;

a second sheet as in the first sheet molded over a second mold to provide a second surface;

a third sheet of thermoformable plastic composed of at least one layer of polyolefin resin molded over a third mold to provide a rigid member comprising an array of upward extending ribs, an array of downward extending channels and between the ribs and channels hollow areas containing dead air space;

the third sheet being compressed between the first and second sheets upon a machine frame to provide a rigid unitary structure wherein upper surfaces

of the ribs bond to the interior substrate layer of the first sheet and lower surfaces of the channels bond to the interior substrate layer of the second sheet;

the surface layers of the intumescent polyolefin compositions of the first and second sheets being exteriorly visible preventing the interior substrate layers of the first and second sheets from supporting a flame upon exposure to fire; and

the surface layers of the intumescent polyolefin compositions of the first and second sheets and the dead air space insulating the third sheet, the third sheet resisting the heat of the fire to remain rigid.

12. An article as in claim 11 wherein the third sheet includes additives imparting high temperature strength.

13. An article as in claim 11 wherein the article is an industrial platform.

14. An article as in claim 11 wherein within said hollow areas resides a wireless communications device, the device being adapted to transmit an emergency signal to a remote monitoring station when said article is exposed to fire or the heat of fire.

15. A plastic pallet comprising:

a first surface developed to support a load, a second surface below the first surface communicating with a platform, and between the first surface and the second surface at least one hollow space;

within said hollow space an electronic device, the electronic device comprising at least a wireless communicator interfacing with a remote station, thermographic instrumentation developed to monitor external temperature, and circuitry integrating the communicator to the instrumentation;

the thermographic instrumentation responding to variation in external temperature indicative of a fire by alerting circuitry, the circuitry triggering communicator to send an emergency signal to the remote station, the remote station alerting authorities to said fire.

16. A plastic pallet as in claim 15 wherein the electronic device has at least one supply of power, the one supply of power being derived from a primary power supply, said primary power supply being augmented by a secondary power supply, said secondary power supply being derived from a solar battery positioned externally upon one of said surfaces of said plastic pallet.

17. A plastic pallet as in claim 15 wherein the thermographic instrumentation includes a thermoscopic probe, the thermoscopic probe being exteriorly positioned to monitor temperature variation.

18. A plastic pallet as in claim 15 wherein the thermographic instrumentation includes a thermoscopic probe, a solar battery and an RF transponder, the probe, battery and transponder being affixed upon a plate for remote attachment to an external surface of the plastic pallet; and

wherein the electronic device further includes an RF receiver integrated to the wireless communicator, the RF receiver receiving communication from the FR transponder having a solar battery supply of power when said thermoscopic probe is exposed to fire and the heat of fire.

19. A fire resistant pallet comprising:

a pallet assembly; and

a fire resistant layer formed upon an exterior of said pallet assembly.

20. The fire resistant pallet according to claim 19 wherein said pallet assembly is made of a polyolefin resin and wherein said fire resistant layer is made of an intumescent polyolefin material, said pallet assembly and said fire resistant layer being co-extruded.

21. The fire resistant pallet according to claim 20 wherein said intumescent polyolefin material is disposed only on an exterior of said pallet assembly.

22. The fire resistant pallet according to claim 19 wherein said pallet assembly comprises:

a thermoformed pallet shell having a first shell half formed from a first sheet and a second shell half formed from a second sheet; and

a support structure formed from a third sheet disposed between and instantly fused to said first shell half and said second shell half to provide support to said thermoformed pallet shell, said support structure extending across a length of at least one of said first shell half and said second shell half, said support structure having an alternating cross-sectional shape such that said support structure is alternately fused to said first shell half and said second shell half.

23. The fire resistant pallet according to claim 19 wherein said fire resistant layer comprises:

an intumescent polyolefin composition resistant to fire, said intumescent polyolefin composition being co-extruded with at least a portion of said pallet assembly.